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10/511,622	10/18/2004	Masayuki Orihashi	MAT-8605US	4055
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P O BOX 980			BRANDT, CHRISTOPHER M	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/511,622

Applicant(s)

ORIHASHI ET AL.

Examiner

CHRISTOPHER M. BRANDT

Art Unit

2617

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 April 2008.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-35 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 23 April 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
3) ☐ Information Disclosure Statement(s) (PTO/CDC)
Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

This application is in response to applicant's amendment filed on April 23, 2008. **Claims 1-35** are now pending in the present application. **This Action is made FINAL.**

Response to Arguments

Applicant's arguments with respect to claims 1-35 have been considered but are moot in view of the new ground(s) of rejection. The examiner notes that FullertonA is applicable to the claims as currently written since there is no recitation of "narrow band" in the claims.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

After a thorough review by the examiner, the limitation, "at least two of the subcarriers including the same data", was determined not to be supported in the specification. The examiner encourages applicants to provide page and line citations, if the applicants disagree.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, on line 14 it appears the applicants intended to use “transmission signals”, however the claim only reads “transmission”. The examiner read the claim as “the plurality of transmission signals”, since this limitation is referred use previously in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 6-8, 15-22, 24, 29, and 31 are rejected under 35 USC 103(a) as being unpatentable over **Fullerton et al. (US Patent 5,677,927, hereinafter FullertonA)** in view of **Rouquette et al. (US Patent 7,308,035 B2, hereinafter Rouquette)**.

Consider **claim 1 (and similarly applied to claim 32)**. FullertonA discloses a communication apparatus comprising:

a modulation part for impulse-modulating transmission data and generating a plurality of subcarriers modulation signals (figure 17, column 18 lines 16-44, read as an impulse radio transmitter having three subcarrier generator/modulators, each having a different subcarrier frequency, where signals are fed to modulator and subcarriers signals are generated);

a transmission part for amplifying the plurality of subcarrier-transmission signals and generating a plurality of subcarrier-transmission signals (column 24 lines 31-44, read as amplifier buffers the product signal);

a filter section for outputting a plurality of transmission signals, the transmission signals being band-limited of the plurality of subcarrier-transmission signals (column 24 lines 31-44, read as the integrator is essentially a low-pass filter of first order, which is adapted to respond on a time scale similar to the width of the monocycle, which outputs the signal); and

an antenna section for radiating the plurality of transmission (column 18 lines 58-61, read as the modulated, coded timing signal output by the subcarrier time modulator is fed to the output stage and transmitted as an emitted signal).

FullertonA substantially discloses the claimed invention but fails to explicitly teach at least two of the subcarriers including the same data and to multiplex the plurality of transmission signals.

However, Rouquette teaches at least two of the subcarriers including the same data and to multiplex the plurality of transmission signals (column 1 lines 39-48, read as the same data is transmitted over different physical paths interleaved in time, in particular over different transmit and/or receive antenna elements, and frequency spreading where the same data is spread over different channels distinguished by their sub-carrier frequency).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the teachings of Rouquette into the invention of FullertonA in order to improve the communication capacity of the systems while reducing the sensitivity of the systems to noise and interference and limiting the power of the transmissions (column 1 lines 39-42).

Consider **claim 6 and as applied to claim 1**. FullertonA and Rouquette disclose wherein the transmission modulation part assigns a narrower band to the subcarrier having a lower center frequency and a broader band to the subcarrier having a higher center frequency (FullertonA; column 8 lines 31-40).

Consider **claim 7 and as applied to claim 1**. FullertonA and Rouquette disclose a channel control section for selecting and controlling the subcarrier for use on each channel, the channel control section performing communication over two or more channels with different ones of the subcarriers (FullertonA; column 19 lines 16-61).

Consider **claim 8 and as applied to claim 7**. FullertonA and Rouquette disclose wherein the channel control section performs communication over two or more channels with a combination of different ones of the subcarriers (FullertonA; column 19 lines 16-61).

Consider **claim 15 and as applied to claim 7**. FullertonA and Rouquette disclose wherein the modulation part divides one symbol into two or more of the subcarriers, thereby multiplexing two or more channels (FullertonA; column 18 lines 45-61).

Consider **claim 16 and as applied to claim 15**. FullertonA and Rouquette disclose wherein the modulation part causes frequency hopping in one symbol by use of two or more of the subcarriers, to thereby multiplexing two or more channels (FullertonA; column 18 lines 45-61).

Consider **claim 17 and as applied to claim 15**. FullertonA and Rouquette disclose wherein the modulation part causes encoded spread of one symbol onto two or more of the subcarriers, to thereby multiplexing two or more channels (FullertonA; column 18 lines 45-61).

Consider **claim 18 and as applied to claim 15**. FullertonA and Rouquette disclose wherein the modulation part causes spread of one symbol onto two or more of the subcarriers and two or more chips, thereby multiplexing two or more channels (FullertonA; column 22 lines 55-67).

Consider **claim 19 and as applied to claim 1**. FullertonA and Rouquette disclose wherein the antenna part comprises a plurality of antenna elements (FullertonA; column 13 lines 3-8).

Consider **claim 20 and as applied to claim 1**. FullertonA and Rouquette disclose wherein the antenna part has a frequency characteristic of a multi-band characteristic (FullertonA; column 13 lines 3-10, column 14 lines 7-23).

Consider **claim 21 and as applied to claim 19**. FullertonA and Rouquette disclose wherein the antenna elements are different in center frequency of frequency characteristic (FullertonA; column 13 lines 3-10, column 14 lines 7-23).

Consider **claim 22 and as applied to claim 21**. FullertonA and Rouquette disclose wherein the antenna elements have band characteristics not to overlap on a frequency axis (FullertonA; column 27 line 66 – column 28 line 17).

Consider **claim 24 and as applied to claim 19**. FullertonA and Rouquette disclose wherein the antenna elements have frequency characteristics corresponding to the subcarriers and radiate subcarrier transmission signal as a radio wave (FullertonA; column 27 line 66 – column 28 line 17).

Consider **claim 29 and as applied to claim 1**. FullertonA and Rouquette disclose wherein the transmission demodulation part comprises a spread code storing part for storing a spread code and extracting a spread code corresponding to the subcarrier, and a spread part for making a direct spread onto the subcarrier from the modulation signal divided into the

subcarriers and the spread code extracted at the spread code storing part (FullertonA; column 19 lines 11-31).

Consider **claim 31 and as applied to claim 1**. FullertonA and Rouquette disclose wherein the transmission demodulation part comprises a switch part for switching over by frequency hopping on the subcarrier, the carrier control part carrying out the control in the switch section (FullertonA; column 23 lines 1-19).

Claims 2-5, 9, 13, 14, 23, 25-28, 30, 35 are rejected under 35 USC 103(a) as being unpatentable over **Fullerton et al. (US Patent 5,677,927, hereinafter FullertonA)** in view of **Rouquette et al. (US Patent 7,308,035 B2, hereinafter Rouquette)** and further in view of **Aslanis et al. (US PGPUB 2002/0094049 A1, hereinafter Aslanis)**.

Consider **claim 35 and as applied to claim 1**. FullertonA and Rouquette disclose the claimed invention but fail to explicitly teach a carrier control part for controlling the subcarriers for use in communication depending upon information amount, significance and communication propagation condition.

However, Aslanis teaches a carrier control part for controlling the subcarriers for use in communication depending upon information amount, significance and communication propagation condition (paragraph 6, read as The bits of input data for transmission within each block or symbol period are allocated to the sub-carriers in a manner which is dependent upon the signal-to-noise ratios (SNRs) of the sub-carriers, typically so that the bit error rates of the sub-carriers, as monitored at the receiver, are substantially equal).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the teachings of Aslanis into the invention of FullertonA and Rouquette in so that the bit error rates of the sub-carriers as monitored at the receiver, are substantially equal (paragraph 6).

Consider **claim 2 and as applied to claim 35**. FullertonA and Rouquette disclose a reception modulation part for detecting reception data and examining a reception power on each subcarrier, to notify to the subcarrier control section a permission/non-permission to use the subcarrier, depending upon the reception power examined by the reception demodulation part (FullertonA; column 28 lines 17-30).

Consider **claim 3 and as applied to claim 2**. FullertonA and Rouquette disclose wherein the carrier control section causes hopping two or more of the subcarriers (FullertonA; column 18 lines 52-61, column 21 lines 49-61).

Consider **claim 4 and as applied to claim 2**. FullertonA and Rouquette disclose wherein the carrier control section causes spread on two or more of the subcarriers (FullertonA; column 18 lines 52-61, column 21 lines 49-61).

Consider **claim 5 and as applied to claim 1**. FullertonA, Rouquette, and Aslanis disclose wherein the transmission modulation part changes an on-frequency allocation of the subcarriers according to communication condition (Aslanis; paragraph 6).

Consider **claim 9 and as applied to claim 35**. FullertonA and Rouquette disclose wherein carrier control part performs communication of control information by at least one of the subcarriers (FullertonA; column 2 lines 11-29).

Consider **claim 13 and as applied to claim 9**. FullertonA and Rouquette disclose wherein the subcarrier with which the modulation part is to communicate the control information has a center frequency lower than a center frequency of the other subcarrier (FullertonA; column 7 lines 1-9).

Consider **claim 14 and as applied to claim 9**. FullertonA and Rouquette disclose wherein the subcarrier with which the modulation part is to communicate the control information has a band narrower than a band of the other subcarrier (column 10 lines 43-56).

Consider **claim 23 and as applied to claim 2**. FullertonA and Rouquette disclose wherein the antenna part receives radio wave on a subcarrier-by-subcarrier basis and outputs the subcarrier signal to the reception modulation part (FullertonA; column 19 lines 16-61).

Consider **claim 25 and as applied to claim 2**. FullertonA and Rouquette disclose wherein the reception demodulation part has a compensation part for detecting a characteristic of a subcarrier-based signal sub-system r from a known signal received from a communication partner and compensating for the characteristic of the signal sub-system (FullertonA; column 19 lines 16-61).

Consider **claim 26 and as applied to claim 25**. FullertonA and Rouquette disclose wherein the characteristic of the signal sub-system is a frequency characteristic (FullertonA; column 3 lines 61-67).

Consider **claim 27 and as applied to claim 25**. FullertonA and Rouquette disclose wherein the characteristic is a time response characteristic of the signal sub-system, the

compensation part compensating for the time response characteristic by a correlation signal of a correlator (FullertonA; column 20 lines 52-65).

Consider **claim 28 and as applied to claim 2**. FullertonA and Rouquette disclose wherein the reception demodulation part comprises a spread code storing part for storing a spread code and extracting a spread code corresponding to the subcarrier, and a disspread part for making a convolution operation of the subcarrier signal and the spread code extracted at the spread code storing section (FullertonA; column 19 lines 1-10).

Consider **claim 30 and as applied to claim 2**. FullertonA and Rouquette disclose wherein the reception demodulator comprises a switch section for switching over by frequency hopping on the subcarrier, the carrier control section carrying out the control in the switch section (FullertonA; column 23 lines 1-19).

Claims 10-12 are rejected under 35 USC 103(a) as being unpatentable over **Fullerton et al. (US Patent 5,677,927, hereinafter FullertonA)** in view of **Rouquette et al. (US Patent 7,308,035 B2, hereinafter Rouquette)** in view of **Aslanis et al. (US PGPUB 2002/0094049 A1, hereinafter Aslanis)** and further in view of **Fullerton (US Patent 5,687,169, hereinafter FullertonB)**.

Consider **claim 10 and as applied to claim 9**. FullertonA and Rouquette disclose the claimed invention but fail to explicitly teach wherein the modulation part multiplexes together the pieces of control information on three or more channels by use of any one of time division multiplex and code division multiplex, in at least one subcarrier of two or more of the subcarriers.

However, FullertonB teaches the modulation part multiplexes together the pieces of control information on three or more channels by use of any one of time division multiplex and code division multiplex, in at least one subcarrier of two or more of the subcarriers (column 11 lines 43-55, column 13 lines 40-47).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the teachings of FullertonB into the invention of FullertonA, Rouquette, and Aslanis in order to provide two-way transmittal of information (column 9 lines 56-65).

Consider **claim 11 and as applied to claim 2**. FullertonA, Rouquette, and Aslanis disclose the claimed invention but fail to explicitly teach wherein the modulation section carries out frequency division duplex by use of two or more of the subcarriers.

However, FullertonB teaches wherein the modulation section carries out frequency division duplex by use of two or more of the subcarriers (column 12 lines 35-65).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the teachings of FullertonB into the invention of FullertonA, Rouquette, and Aslanis in order to provide two-way transmittal of information (column 9 lines 56-65).

Consider **claim 12 and as applied to claim 9**. FullertonA, Rouquette, and Aslanis disclose the claimed invention but fail to explicitly teach wherein the modulation section carries out frequency division duplex by use of three or more of the subcarriers.

However, Fullerton teaches wherein the modulation section carries out frequency division duplex by use of three or more of the subcarriers (column 12 lines 35-65).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the teachings of FullertonB into the invention of FullertonA, Rouquette, and Aslanis in order to provide two-way transmittal of information (column 9 lines 56-65).

Claims 32-34 are rejected under 35 USC 103(a) as being unpatentable over **Toshimitsu (US Patent 6,735,256 B1)** in view of **Rouquette et al. (US Patent 7,308,035 B2, hereinafter Rouquette)** and further in view of **Fullerton et al. (US Patent 5,677,927, hereinafter FullertonA)**.

Consider **claims 32**. Toshimitsu discloses a communication method for modulation communication with using a plurality of subcarriers (column 4 lines 28-35), the communication method comprising:

a step of measuring a reception power on every subcarrier in a non-signal state, in an initial state prior to starting a communication (column 6 line 66 –column 7 line 6, read as measuring a fluctuation of reception power for every sub-carrier in the NAK signal and feeding back the result); and

a step of determining the reception power measured and selecting the subcarrier usable in communication (column 8 lines 16-24, read as the level judgment section 25 includes a selector, where the level judgment section inputted are reception levels of all sub-

carriers (N sub-carriers) detected by the level detector. The selector in the level judgment section selects M signals from N sub-carriers).

Toshimitsu substantially discloses the claimed invention but fails to explicitly teach at least two of the subcarriers including the same data.

However, Rouquette teaches at least two of the subcarriers including the same data (column 1 lines 39-48, read as the same data is transmitted over different physical paths interleaved in time, in particular over different transmit and/or receive antenna elements, and frequency spreading where the same data is spread over different channels distinguished by their sub-carrier frequency).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the teachings of Rouquette into the invention of FullertonA in order to improve the communication capacity of the systems while reducing the sensitivity of the systems to noise and interference and limiting the power of the transmissions (column 1 lines 39-42).

In addition, Toshimitsu and Rouquette fail to explicitly teach that the modulation can be impulse modulation.

However, FullertonA teaches impulse modulation (column 1 lines 26-32).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the teachings of FullertonA into the invention of

Toshimitsu and Rouquette in order to emit short Gaussian monocycle pulses with tightly controlled average pulse-to-pulse interval (column 1 lines 26-32).

Consider **claim 33 and as applied to claim 32**. Toshimitsu, Rouquette, and Rouquette disclose wherein the determination is to use, in a later communication, the subcarrier having the reception power equal to or smaller than a predetermined value (FullertonA; column 28 lines 17-39).

Consider **claim 34 and as applied to claim 33**. Toshimitsu, Rouquette, and Rouquette disclose further comprising a step of measuring a reception power on every subcarrier of a received known signal at a start of communication; and a step of selecting the subcarrier having the measured reception power equal to or greater than a predetermined value, as a subcarrier usable in communication (FullertonA; column 28 lines 17-39).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any response to this Office Action should be **faxed to (571) 273-8300 or mailed to:**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Hand-delivered responses should be brought to

Customer Service Window
Randolph Building
401 Dulany Street

Alexandria, VA 22314

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher M. Brandt whose telephone number is (571) 270-1098. The examiner can normally be reached on 7:30a.m. to 5p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, George Eng can be reached on (571) 272-7495. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist/customer service whose telephone number is (571) 272-2600.

Christopher M. Brandt

C.M.B./cmb

July 20, 2008

/George Eng/

Supervisory Patent Examiner, Art Unit 2617